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Resonant oscillations of a gas in an open tube in the shock-free wave mode

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Abstract

© 2016, Pleiades Publishing, Ltd.Nonlinear gas oscillations excited in an open tube by a flat piston at one of the tube ends are studied. The sinusoidal piston oscillations in the shock-free wave mode are created by a vibration exciter near the first eigenfrequency. Expressions for gas pressure oscillations are obtained for a tube with a nonrounded end without a flange and secondary flow velocity components. The influence of the piston displacement amplitude on the pressure range and secondary flow velocity of gas is studied. The theoretical calculations of the gas pressure are compared with experimental data. An estimate for the velocity of particle motion along the tube axis is presented with calculated values of the secondary flow velocity.

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Keywords

open tube, particle drift, pressure, resonant oscillations of a gas, secondary flows